The Single Crew Module Concept for Exploration

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Many concepts have been proposed for exploring space. In early 2010 presidential direction called for reconsidering the approach to address changes in exploration destinations, use of new technologies and development of new capabilities to support exploration of space. Considering the proposed new technology and capabilities that NASA was directed to pursue, the single crew module (SCM) concept for a more streamlined approach to the infrastructure and conduct of exploration missions was developed. The SCM concept combines many of the new promising technologies with a central concept of mission architectures that uses a single habitat module for all phases of an exploration mission. Integrating mission elements near Earth and fully fueling them prior to departure of the vicinity of Earth provides the capability of using the single habitat both in transit to an exploration destination and while exploring the destination. The concept employs the capability to return the habitat and interplanetary propulsion system to Earth vicinity so that those elements can be reused on subsequent exploration missions. This paper describes the SCM concept, provides a top level mass estimate for the elements needed and trades the concept against Constellation approaches for Lunar, Near Earth Asteroid and Mars Surface missions.

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